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(56) Documents Cited

US 4100657 A

(58) Field of Search

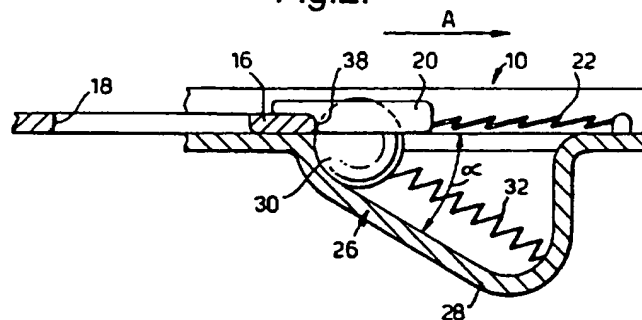
UK CL (Edition P) E2A ACAK
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(54) Abstract Title

Seat belt buckle

(57) A seat belt buckle for use with a tongue 16, includes a frame 10, in which is mounted an ejector 20, operable by an ejector spring 22. Insertion of the tongue pushes a retainer 30 down a track 26, against the action of a retainer spring 32. The track is inclined at an angle α to the path 15 of the tongue and extends outwardly away from the path in the direction of insertion of the tongue. When the tongue has been inserted an adequate amount, the retainer 30, e.g. a ball returns up the ramp under the influence of the spring 32 and engages in an aperture 18 in the tongue to retain the tongue in the locked condition. Operation of a release mechanism (42, Fig 5) disengages the retainer from the aperture thereby to release the tongue.

Fig.2.



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Fig.1.

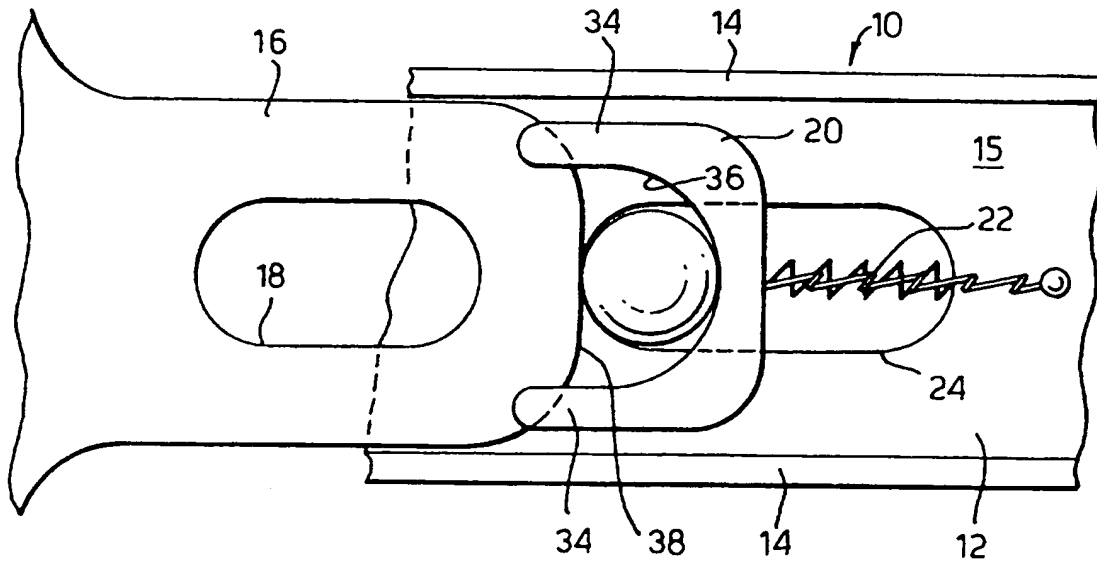


Fig.2.

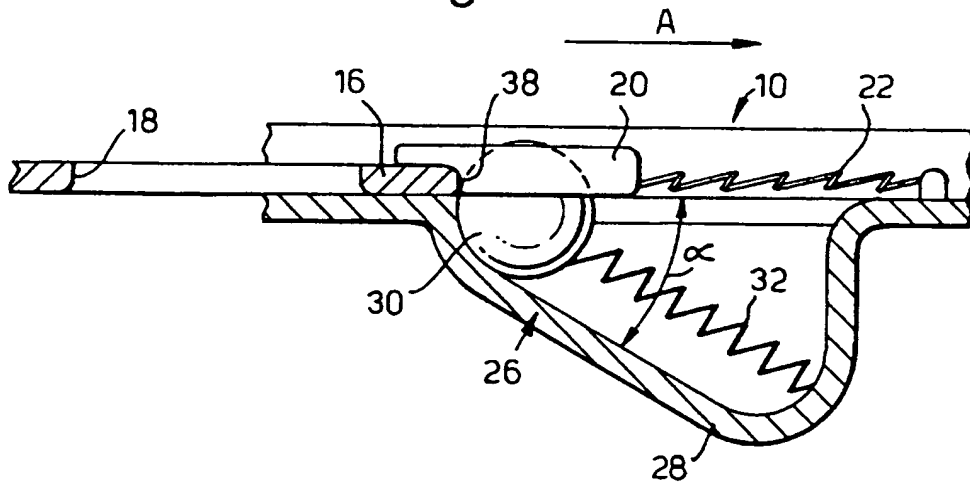


Fig.3.

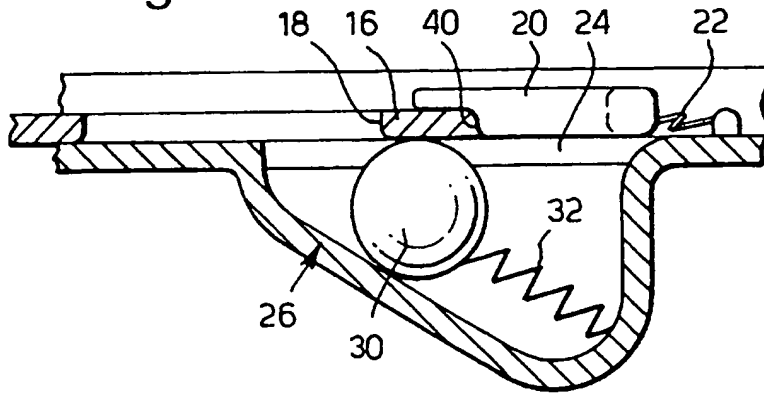


Fig.4.

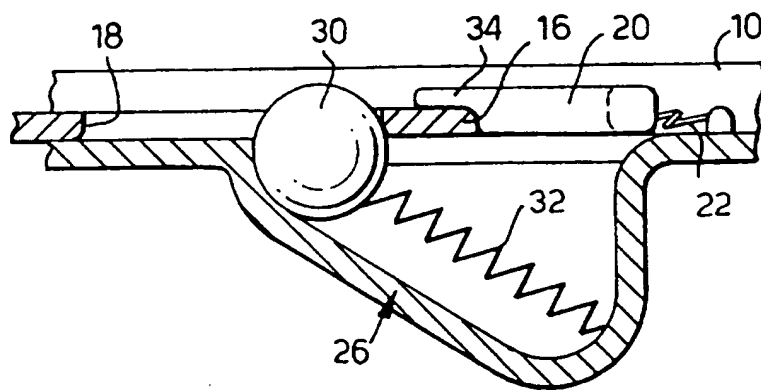
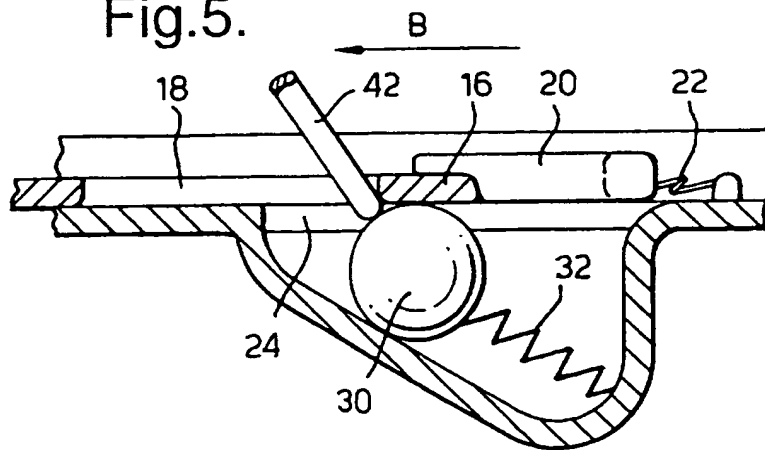


Fig.5.



SEAT BELT BUCKLE

The present invention relates to a seat belt buckle. Seat belt buckles have been available for very many years now and are now rather sophisticated and complicated mechanisms. Several types of buckle include a frame, and a tongue adapted to be carried on the seat belt and slidably insertable into the frame along a planar path.

An ejector is provided which is spring urged to be able to push the tongue out again at an appropriate moment.

Various different forms of locking mechanism are provided which are usually very complex and therefore rather expensive to manufacture. For example, US 4,100,657 discloses a buckle in which insertion of the tongue in one direction against the bias of the ejector is associated with motion of a release button in the opposite direction. A ramp on the release button forces a roller into an opening in the tongue. This mechanism requires the co-ordinated motion of the ejector and release button. The inclination of the ramp is also such that even when the buckle and tongue are under load, a slight pressure on the release button will eject the tongue.

According to the present invention there is provided a seat belt buckle comprising a frame, a tongue adapted to be carried by the seat belt and slidably insertable into the frame along a planar path in an insertion direction, said tongue having an aperture therein, an ejector slidable in said frame along said path and engagable by said tongue when inserted in said frame, an ejector spring urging said ejector in a direction to push said tongue in the reverse direction along said path, a track inclined at an acute angle to said planar path and extending at said acute angle outwardly away from said planar path in said insertion direction, a retainer movable

along said track and lockingly engagable in the aperture in the tongue at a location where the track intersects the path, a retainer spring urging said retainer along the track towards the path, and a release mechanism adapted to
5 disengage the retainer from the aperture, thereby to release the tongue.

It will be appreciated that the structure of the present invention can be made extremely simply with a very small number of working parts. Nonetheless the seat belt
10 buckle of the present invention can be adequately strong and at least as reliable in use as conventionally available seat belt buckles.

The track may simply be a ramp formed in the frame, and may include a recessed portion accurately to
15 guide the retainer along the track.

In a preferred structure the retainer is simply a steel ball, but other structures are contemplated including a roller, or a suitably shaped slider block.

In order that the present invention may more
20 readily be understood, the following description is given, merely by way of example, reference being made to the accompanying drawings in which:-

Figure 1 is a planned view of one embodiment of seat belt buckle according to the present invention;

25 Figure 2 is a side elevation, partly in section, of the buckle of Figure 1 in the locked position; and

Figures 3, 4 and 5 show various movements of the retainer of the buckle of Figures 1 and 2.

Referring to the drawings, Figure 1 illustrates a
30 frame 10, including a flat base 12, and two upstanding side walls 14. Although not shown in the drawing the top of the side walls will include inwardly directed flanges which, together with the side walls and base, define an elongate slot defining a planar path 15 into which may be inserted
35 the tongue 16 which is conventionally attached to a seat

belt buckle, the tongue having an aperture 18 therein.

Also mounted slidably in the frame is an ejector 20 which is urged to the left, as seen in Figure 1, by a ejector spring 22.

5 Formed in the base 12 of the frame is an elongate aperture 24 having semi-circular rounded ends.

Formed integrally with, or mounted on the bottom of the base is a track 26 defined by the upper surface of a ramp 28. Slidable or rollable along the ramp 28 is a
10 retainer 30 shown in the form of a spherical ball. Associated with the retainer is a retainer spring 32 which urges the retainer upwardly and to the left as shown in Figure 2.

If reference is again made to Figure 1, it will be
15 seen that the ejector 20 includes two arms 34 which define therebetween a semi-circular surface 36.

If reference is made now to Figures 3 and 4, in combination with Figure 2, in use the tongue 16 is inserted into the slot defined in the frame, and the leading edge 38
20 of the tongue abuts the front surface of the retainer ball 30 and pushes it downwardly along the track 26. The track is inclined at an acute angle α to the path of the tongue and extends outwardly away from the path in the insertion direction, indicated by the arrow A, of the tongue, as
25 illustrated, so that the retainer is naturally pushed out of the way by the leading edge of the tongue.

The leading edge also abuts a surface 40 on the ejector 20 and pushes it to the right against the action of the ejector spring 22.

30 As the tongue moves further to the right, the retainer spring 32 is able to push the retainer ball 30 again up the ramp 26 so that it enters, through the slot 24, the aperture 18 in the tongue. This position is illustrated in Figure 4.

35 At this stage the ejector 20, which includes the

arms 34, extending over the forward end of the tongue 16, urges the tongue backwardly. In this position the retainer ball 30 prevents the tongue moving any further to the left, and hence retains the tongue in this locked condition. Any
5 load applied which tends to move the tongue to the left simply holds the retainer ball more securely in the locked position and also resists operation of a release mechanism to avoid inadvertent release of the tongue. This is because to release the tongue, the retainer ball must move down and
10 to the right against any force urging it to the left.

In order to release the buckle, the latter may be provided with a release button which forms part of a release mechanism including a release pin 42, which, when operated, passes through the aperture 18, and the slot 24, to engage
15 the retainer ball 30, thereby to push the ball retainer 30 down the ramp or track 26, against the action of the spring 32 (see Figure 5).

When the retainer ball 30 reaches the position illustrated in Figure 5, it is below the forward end of the
20 tongue 16, and the ejector spring 22 can then move the ejector 20, and thus the tongue 16, in the reverse direction indicated by the arrow B to the left to be released.

It will be appreciated that this structure is very simple and is therefore inexpensive to manufacture, while
25 being capable of operating reliably.

CLAIMS

1. A seat belt buckle comprising a frame, a tongue adapted to be carried by the seat belt and slidably insertable into the frame along a planar path in an insertion direction, said tongue having an aperture therein, an ejector slidable in said frame along said path and engagable by said tongue when inserted in said frame, an ejector spring urging said ejector in a direction to push said tongue in the reverse direction along said path, a track inclined at an acute angle to said planar path and extending at said acute angle outwardly away from said planar path in said insertion direction, a retainer movable along said track and lockingly engagable in the aperture in the tongue at a location where the track intersects the path, a retainer spring urging said retainer along the track towards the path, and a release mechanism adapted to disengage the retainer from the aperture, thereby to release the tongue.
2. A buckle according to claim 1, wherein the track is a ramp formed in the frame.
3. A buckle according to claim 1 or 2, wherein the retainer is a ball.
4. A buckle according to claim 1 or 2, wherein the retainer is a roller.
5. A seat belt buckle substantially as hereinbefore described with reference to the accompanying drawings.



Application No: GB 9812178.3
Claims searched: 1-5

Examiner: Robert H Games
Date of search: 28 September 1998

Patents Act 1977
Search Report under Section 17

Databases searched:

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:

UK CI (Ed.P): E2A (ACAK)

Int CI (Ed.6): A44B 11/25

Other:

Documents considered to be relevant:

Category	Identity of document and relevant passage	Relevant to claims
X	US 4100657 (KLIPPAN) see Figs especially ramp 19	1-4

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art.
Y	Document indicating lack of inventive step if combined with one or more other documents of same category.	P	Document published on or after the declared priority date but before the filing date of this invention.
&	Member of the same patent family	E	Patent document published on or after, but with priority date earlier than, the filing date of this application.